Understanding a Driver’s First Exposure to ADAS and its Impact on Future Consumer Education

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Key Research Objectives
1. Do drivers who have never been exposed to ADAS technologies experience a change in their understanding, knowledge, trust, and willingness to use those after they have:
   • Observed the technologies in use during a demonstration drive, OR
   • Read about the technologies in an owner’s manual, OR
   • Both read about and observed the technologies?
2. How do drivers prefer to learn about different ADAS technologies and do their preferences change after the study?

Study Protocol
- Eligibility Survey
  • Age 30-55
  • Drives at least 90 minutes/week
  • No prior experience with ACC, PPA, or BSM
- Pre-Visit Survey (at home)
  • Intake Survey
  • Protocol Condition (1 of 4 listed under Research Design)
  • Post-Visit Survey (same items as Pre-Visit Survey)
- Site Visit (at UI)
  • Owner’s Manual + Demo Drive
  • Demo Drive + Owner’s Manual
  • Demo Drive Only
  • Owner’s Manual Only

Technologies Included in the Study
- Parallel Parking Assist
- Rear Cross Traffic Alert
- Lane Keeping Assist
- Adaptive Cruise Control
- Blind Spot Monitor
- Lane Departure Warning
- EBD

Research Design: Subjects randomly assigned to one of four possible conditions

Findings
The findings below detail knowledge, perceptions, and learning preference by respondents.

ADAS Technology Knowledge was measured by scoring participants’ answers to 22 multiple choice knowledge question items, assigning a value of 1 when the correct answer was selected and 0 otherwise. The table below showcases that, on average, the knowledge scores increased by 10 points on the Post-Visit Survey.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Visit Mean</th>
<th>SD</th>
<th>Post-Visit Mean</th>
<th>SD</th>
<th>t statistic</th>
<th>p value</th>
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</thead>
<tbody>
<tr>
<td>Composite Knowledge Score</td>
<td>5.99</td>
<td>2.970</td>
<td>16.45</td>
<td>2.688</td>
<td>31.053</td>
<td>&lt;0.001</td>
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</tbody>
</table>

ADAS Technology Perception Ratings were assessed by participants’ answers to seven questions from the Pre- to Post-Visit Survey. The trust, usefulness, and apprehension findings below detail the function descriptions for each technology (rather than the actual function name).

Trust:
Participants’ ratings of trust in the systems all increased significantly (all p values ≤ 0.002), except for BSM.

Usefulness:
• Participants agreed more strongly that all functions of ACC and PPA would be useful in their driving (all p values < 0.001).
• On average, before their protocol, participants “agreed” to “strongly agreed” that LKA, BSM, and RCTA functions would be useful and the ratings did not change significantly.

Apprehension:
Participants’ ratings for all seven ADAS technology functions decreased significantly (all p values ≤ 0.002, except for BSM which had a p value of 0.035).

Learning Preference:

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<tbody>
<tr>
<td>Adapative Cruise Control</td>
<td>15</td>
<td>7</td>
<td>25</td>
<td>40</td>
<td>38</td>
<td>29</td>
<td>32</td>
<td>44</td>
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<tr>
<td>Blind Spot Monitor</td>
<td>20</td>
<td>14</td>
<td>28</td>
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<td>10</td>
<td>27</td>
<td>50</td>
<td>36</td>
<td>24</td>
<td>29</td>
<td>36</td>
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<tr>
<td>Parallel Parking Assist</td>
<td>16</td>
<td>6</td>
<td>27</td>
<td>45</td>
<td>39</td>
<td>23</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>Rear Cross Traffic Alert</td>
<td>24</td>
<td>14</td>
<td>27</td>
<td>52</td>
<td>33</td>
<td>20</td>
<td>29</td>
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</tbody>
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Conclusion
This research greatly adds to the scientific knowledge base of driver understanding and human factors issues to be considered, as these ADAS technologies continue to proliferate the market. The research protocol has the potential to serve as a foundation for measuring and understanding drivers’ attitudes toward and knowledge about current and future vehicle safety technologies.